



LICOS Centre for Institutions and Economic Performance

Centre of Excellence

LICOS Discussion Paper Series

Discussion Paper 232/2009

Mass Media and Public Policy: Global Evidence from Agricultural Policies

Alessandro Olper and Johan F.M. Swinnen



Katholieke Universiteit Leuven

LICOS Centre for Institutions and Economic Performance
Huis De Dorlodot
Deberiotstraat 34 – mailbox 3511
B-3000 Leuven
BELGIUM

TEL: +32-(0)16 32 65 98

FAX: +32-(0)16 32 65 99

<http://www.econ.kuleuven.be/licos>

**Mass Media and Public Policy:
Global Evidence from Agricultural Policies**

Alessandro Olper^{*} and Johan F.M. Swinnen^{**}

Version: 1 February 2009

Abstract

Mass media plays a crucial role in information distribution and thus in the political market and public policy making. Theory predicts that information provided by mass media reflects the media's incentives to provide news to different types of groups in society, and affects these groups' influence in policy-making. We use data on agricultural policy from 60 countries, spanning a wide range of development stages and media markets, to test these predictions. We find that, in line with theoretical predictions, public support to agriculture is strongly affected by the structure of the mass media. In particular, a greater role of the private mass media in society is associated with policies which benefit the majority more: it reduces taxation of agriculture in poor countries and reduces subsidization of agriculture in rich countries, *ceteris paribus*. The evidence is also consistent with the hypothesis that increased competition in commercial media reduces transfers to special interest groups and contributes to more efficient public policies.

JEL classification: D72, D83, Q18

Keywords: Mass Media; Media Structure; Information; Agricultural Protection; Political Economy

^{*} Department of Agricultural, Food and Environmental Economics, University of Milano, alessandro.olper@unimi.it.

^{**} LICOS Centre for Institutions and Economic Performance, University of Leuven (KUL), jo.swinnen@econ.kuleuven.be.

**Mass Media and Public Policy:
Global Evidence from Agricultural Policies**

1. Introduction

There is a rapidly growing literature on the economics of the mass media, leading to a series of important new hypotheses and insights in an area which for a long time was neglected by economists (McCluskey and Swinnen, 2008). An important part of this literature concerns the role of mass media in political markets and its effect on public policy-making. Most of this literature on the relationship between mass media and public policy is theoretical. A few empirical studies have tried to assess the effect of media on policy outcomes. Some key findings from this literature suggests that access to mass-media empowers people politically, and, as such, increases their benefit from government programs (Strömberg and Snyder, 2008). This influence has been found for different types of government programs and different countries, such as unemployment relief in the United States (Strömberg, 2004b), public food provision and calamity relief in India (Besley and Burgess, 2001, 2002), and educational spending in Uganda and Madagascar (Reinikka and Svensson, 2005; Francken et al., 2009). All of these studies measure the effect within a single country, which has the benefit of keeping many other factors fixed but has the potential disadvantage of having limited variation in policy and media

Our paper wants to contribute to this empirical literature by analyzing the impact of mass media on policy-making for a specific type of policy across a wide variety of countries. We use a new dataset which has been produced by the World Bank which includes measures of agricultural subsidization and taxation for a much wider set

of countries and longer period of time than has been available before (Anderson and Valenzuela, 2008). We use these data as dependent variables.

Agricultural policy (subsidization or taxation) is an excellent policy instrument to study the impact of media on policy choice across a wide variation of countries for both empirical and theoretical reasons. Empirically, agricultural policy is an important policy for governments in both rich and poor countries. In poor countries where agriculture is a very important share of the economy and where food is a major consumption item the importance of agricultural policy as a public policy issue is obvious. However, also in rich countries agricultural policy remains disproportionately important compared to the relatively small share of agriculture in terms of economic output. For example in the EU, the Common Agricultural Policy continues to absorb 40% of the entire EU budget. Another symptom of this continued importance of agricultural policy for rich countries is the stand-off in the current WTO negotiations where disagreements over agricultural policies is now threatening to undermine the entire WTO agreement.

Also from a theoretical perspective agricultural policy is an interesting case. The literature on the political economy of agricultural policy identifies group size (the number of farmers versus the number of food consumers in the economy) as an important causal factor. Group size is argued to play an important role because it affects collective action costs (based on Olson, 1965) and because it affects per capita costs and benefits of agricultural policy, which then affects political outcomes in the presence of voter information costs (based on Downs, 1957), or if political activities are proportional to the size of the potential policy costs and benefits (Swinnen 1994). Recent papers in the media economics literature claim that mass media can play an

important role in public policy, precisely by altering these political economy mechanisms (Stromberg 2001, 2004a; Kuzyk and Mc Cluskey, 2006). In fact, Oberholzer-Gee and Waldfogel (2005) argue that the link between group size and political mobilization depends on the structure of media markets. In a series of influential papers, Strömberg (2001; 2004a) has shown that competition among the mass media leads to the provision of more news/information to large groups such as taxpayers and dispersed consumer interests, altering the trade-off in political competition, and thus influencing public policy. He refers to this outcome as ‘mass media-competition-induced political bias’.

The purpose of our paper is to evaluate whether mass media has an impact on the political economy of agricultural policies using data from many countries. In this way this paper contributes to an emerging literature analyzing whether the diffusion of free and independent media are key ingredients to more efficient public policies. Besley and Burgess (2001, 2002) use a political agency model to show that having a more informed and politically active electorate increases the incentives for a government to be responsive. Prat and Strömberg (2005) show, for Sweden, that people who start watching commercial TV news programs increase their level of political knowledge and their political participation. Overall, this and other evidence support the idea that mass media weakens the power of special interest in lobbies relative to unorganized interests.

The paper also contributes to the literature on the political economy of agricultural policies. While there is an extensive literature, both theoretical and empirical, on what determines agricultural policy-making (see de Gorter and Swinnen

(2002) and Swinnen (2009) for surveys), no study so far has looked at the role of the media in this process. Our paper is the first to do so.

Our analysis, based on a sample of 60 countries, indicates that mass media may have a substantive impact on public policy towards agriculture. In the developing world, agricultural taxation is reduced by the presence of mass-media, while in developed countries agricultural support is reduced. A key implication of our results is that by increasing government accountability, competition in the media market will reduce distortions in agricultural policy

2. Conceptual framework

In this section we first present a theoretical framework based on Strömberg's (2004a) model of mass media and political competition. Then we discuss the main implication of the model in the light of the worldwide characteristics of media markets and regularities on agricultural policies. Next, we identify testable hypotheses about the effect of mass media competition on agricultural policy outcomes.

2.1 Theory

Two parties, L and R , make binding announcements about the amount z_s of public money they plan to spend on each of $S > 2$ government programs. The two parties set z_s with the objective to maximize the number of votes. Given $N = \sum n_s$ the total number of voters, and n_s the voters in group s who benefit from the program s , the assumption is that each voter benefits from exactly one program. Government spending is constrained by the usual budget rule, $\sum n_s z_s \leq I$, with I the total budget.

Two media firms, A and B , called, for simplicity, newspapers, are the only channel through which the parties' platforms are announced to the voters. The media firms allocate the space quantity, q^A and q^B , on the S spending levels, with the objective of maximizing the number of readers, identical to N voters. Each voter buys only one newspaper, A or B , and, by reading it, will develop some expectations concerning party spending; they will then vote for party L or R (no abstention). The party that wins the election implements the promised expenditure plan.

Voters are assumed to use the media information from newspapers to fully realize the potential gains embedded in the government program. Thus, more precise information on future policies increases the probability that voters will choose the right action. Specifically, voters realize utility $u_i(z_s) = \theta_i u(z_s)$ from the program, when information on z_s is known in advance. On the contrary, uninformed voters receive the utility $u_i(z_s) = \theta_i u(z_s) - v_s$, where v_s is the (exogenous) utility loss. The parameter θ_i captures the idea that the program can be more valuable to some individuals than to others.

It is assumed that all the voters who use program s have an incentive to read any article they find on z_s , while voters that do not use program s do not read the relevant articles. Thus, the probability that a reader will spot some news in the newspaper, ρ , increases with the space allocated for this news, but at decreasing rate: $\rho'(q_s) > 0$, $\rho''(q_s) < 0$. Next, by denoting the expected utility from a newspaper with news profile q to a reader in group s as $w_s(q_s) = \rho(q_s) v_s$, we have $w'_s(q_s) > 0$ and $w''_s(q_s) < 0$.

The reader's newspaper evaluation also depends on other (exogenous) fixed characteristics, like ideology, captured by parameters a_i and b_i . The news profile of

newspapers A and B then give expected utility $w_s(q_s^A) + a_i$ and $w_s(q_s^B) + b_i$ respectively to the voter i using program s . The voter buys newspaper A when $\Delta w_s = w_s(q_s^A) - w_s(q_s^B) \geq b_i - a_i$, and newspaper B otherwise. The newspapers assign a probability distribution $G_s(\cdot)$, with density $g_s(\cdot)$, to the difference $b_i - a_i$. The probability the newspaper attaches to individual i reading newspaper A is $G_s(\Delta w_s)$.

If both newspapers have the same cost function, newspaper A 's expected cost function, C , is assumed as the following linear form

$$C(q^A, q^B) = \underbrace{c_q \sum_s q_s^A}_{\text{first copy costs}} + \underbrace{\sum_s n_s G_s[\Delta w_s] c_s}_{\text{reproduction/distribution costs}}, \quad (1)$$

where c_q is the cost of producing one unit of news space, and c_s is the average cost of reproducing and delivering a newspaper to readers in group s .

Let p_s be the increase in marginal profit from selling an additional newspaper to a voter in group s . This includes the price of the newspaper plus the price per reader in group s paid for by advertisers, minus the average cost of reproducing and delivering a newspaper to a person in group s . The expected profit function of newspaper A is then

$$E(\pi^A) = \sum p_s n_s G_s[\Delta w_s] - c_q \sum q_s^A. \quad (2)$$

Under this setting, Strömberg (2004a) shows that the Nash Equilibrium in the competition between the two newspapers implies that the ratio $w'_s(q_s^A)/w'_s(q_s^B) = 1$ for

all s , and both newspapers set the same news profiles, $q^A = q^B$. For all s , the equilibrium condition is

$$n_s p_s v_s \rho'(q_s^*) = c_q. \quad (3)$$

Relation (3) defines the equilibrium news profile, q_s^* , as a function of several variables. More specifically, q_s^* will be higher for groups more valuable for advertising, groups with a higher private value of news and for news that concerns *large* groups.

How do these results affect policy bias in the political market ? Assume that a voter i derives utility $u_i(z_s^L) + l_i$ and $u_i(z_s^R) + r_i$ from the implemented platform of parties L and R , respectively; with l_i and r_i describing preferences for other fixed policies or candidate characteristics. The model assumption is that the voters are unable to resolve a unique political equilibrium spending level, which thus makes media information concerning these spending levels valuable to them. Thus, voter i votes for party L if $\Delta u_i = E_i [u_i(z_s^L) - u_i(z_s^R)] \geq r_i - l_i$, and for party R otherwise. Voters informed about party policy announcements have $\Delta u_i = u_i(z_s^L) - u_i(z_s^R)$, which represents the differences in the party platforms. Instead, for the uninformed voters, $\overline{\Delta u_i}$ remains constant as it is independent from party announcements.

Political parties, in maximizing the chance of re-election, assign a probability distribution F_s to the difference $r_i - l_i$. The probability that individual i votes for party L is $F_s[\Delta u_i]$. Thus, the expected number of voters for party L is given by

$$E(n^L) = \sum_i \rho_s F_s[\Delta u_i] + (1 - \rho_s) F_s[\overline{\Delta u_i}]. \quad (4)$$

At equilibrium, parties L and R equate the ratio between average marginal utility $u'_s(z_s^L)/u'_s(z_s^R)$, for all s . It follows that both parties will set the same platform, i.e. $z_s^L = z_s^R = z_s^*$, for all s , and for some constant $\lambda > 0$, $n_s \rho(q_s^*) u'_s(z_s^*) = n_s \lambda$.

This equilibrium condition implies that the equilibrium spending levels equate marginal utilities weighted by the share of voters in the group who find news on election platforms. As a corollary, it follows that equilibrium spending on program s , z_s^* , is increasing in the share of informed voters, ρ_s , the size of the group, n_s , the revenue per reader in the group, p_s , and the private value of news, v_s :

$$z_s^* = z^*(\rho_s, n_s, p_s, v_s). \quad (5)$$

In summary, the media competition will induce a policy bias towards large groups because the voters in these groups are more informed, since the mass media targets these groups. It is important to note that the size of the group, n_s , as well as the revenue per reader in the group, p_s , only affect spending via the media market. Put differently, the bias towards large groups is indirect, and only a consequence of media competition.

2.3 Testable hypotheses for agricultural policy

This section discusses the empirical implications and applicability of the model to agricultural policy outcome. The most important stylized fact about agricultural protection and support is the so called ‘development paradox’, namely the taxation-

protection switch of agriculture associated with economic development.¹ The classic interpretation for this pattern is that, on moving from developing to industrialised countries, the farm groups, compared to the consumer and taxpayer groups, become more effective in collective action, as a consequence of the smaller farm numbers and the lower communication and transportation costs inherent in industrial development, all factors that reduce organizational costs and free rider problems for collective action (Olson, 1965). Moreover, since the per capita cost on the rest of society falls with less farmers, the opposition of taxpayers and consumers to (agricultural) subsidies decreases as the number of farmers decreases with economic development (Becker, 1983; Swinnen, 1994; Anderson 1995).

The model developed here suggests that the relationship between agricultural protection and economic development will be affected by the introduction of media competition in the political market. Voter preferences and government policies will be affected by how the media industry provides information to the people. The key prediction of the model is that, *ceteris paribus*, government transfers like agricultural protection should, as an effect of media competition, be biased toward *large* groups². Because the agricultural group is relatively large in poor countries and relatively small in richer ones, an important implication of the model is that, all other things constant, the effect of media competition on agricultural protection should be different in poor vs. rich countries. More specifically, we expect that the impact on agricultural protection

¹ See Anderson (2008) for recent evidence.

² Interestingly, this prediction goes exactly in the opposite direction with respect to the traditional political economy model that does not consider the effect of media bias, like the Becker (1983) and the Swinnen (1994) models. In fact, in those models government transfers tend to be biased toward *small* groups, in line with the well known ‘paradox of numbers’ of Marcur Olson (1965).

induced by mass media competition should be *positive* in poor countries, and *negative* in rich countries. Thus, we can formulate the following empirical prediction:

Hypothesis 1: *Mass media-competition-induced political bias should reduce agricultural protection in rich-(developed) countries, but it should increase it in poor-(developing) countries, ceteris paribus.*

The model assumes that mass media companies maximize profit. This assumption is important because many countries in our dataset have (also) state (controlled) media. Hence, changes in media structure may have important implications for public policy, simply because the objective function of state vs. commercial media could be different. For example, Prat and Strömberg (2005) show that a shift from state-control to private-control of TV news, attracted viewers previously undersupplied with information and contributed to increase both voter information and political participation. Thus, the above assumption of profit-maximizing media holds only, or especially, in situations where the media market is largely dominated by commercial firms. For this reason, the prediction about the effect of media bias on agricultural protection should also be affected by the media owner structure.

We consider two different assumptions about the behavior of state media (Prat and Strömberg, 2005): (i) the public media is unbiased and/or the bias is randomly distributed across countries or, (ii) the public media reflects the political optimum for the government in the absence of commercial media, as the government control causes the public media to present the governments preferences.

The first assumption, normally used in existing theoretical comparisons between state TV and commercial TV, is based on the idea that the former is managed by a social planner (see Anderson and Coate, 2005). This translates into a situation where the state media-induced political-bias is zero. Thus, an increase in private media should benefit agricultural groups in poor countries (who are taxed) and urban groups in rich countries (who are taxed), as these groups are the targets of profit maximizing media.

Under the second assumption, when the media is controlled by the state, there is bias towards government preferences. In agricultural policy, government preferences are biased to favor urban interest in poor countries and agricultural interests in rich countries. Hence, an increase in the share of commercial media should *reinforce* the effect of hypothesis 1 by increasing the information available and the political participation of (large) groups of voters who, under the mass media state monopoly, had less information.

In summary, this leads to the following empirical prediction:

Hypothesis 2: *An increase in the share of private (state) media should be associated with higher (lower) agricultural protection in poor countries, and with lower (higher) protection in rich ones, ceteris paribus.*

3. Data and empirical specification

We test our predictions on a sample of about 60 developing and developed countries observed from 1992 to 2005. Overall, we have more than 750 observations and the panel structure is quite balanced, with the only qualification that, for reasons explained below, the time coverage for transition countries starts from 1996.

3.1 *Dependent variable*

Our dependent variable is the *relative* rate of assistance (*RRA*) to agriculture, calculated as the ratio between the agricultural and non-agricultural nominal rate of assistance: $RRA = [(1 - NRA_{ag})/(1 - NRA_{nonag}) - 1]$, where NRA_{ag} is the nominal assistance to agriculture and NRA_{nonag} is the nominal assistance to non-agricultural sectors. The *NRA* is measured as the weighted average of the nominal rate of assistance at the product level, using as a weight the industry's value share of each product (see Anderson and Valenzuela 2008 for calculation details). Thus, the *NRA* represents the tax equivalent of those border and domestic measures that are under the direct control of the ruler, like import and export tax, subsidies and quantitative restriction, plus domestic taxes or subsidies for farm output and input. One of the key advantages of using *RRA* (instead of *NRA*) as our dependent variable is that, especially in developing countries, an important indirect taxation source for agriculture is the positive protection given to the manufacturing sector as an effect of import-substitution policies. Thus, the *RRA* is a more useful indicator in undertaking an international comparison of the extent to which a country's policy regime has an anti- or pro-agricultural bias (see Anderson and Valenzuela 2008).

3.2 *Mass media variables*

To test the predictions about the effect of the mass media on agricultural policy we needed data on both the share of informed voters, ρ_s , and on the state vs. private structure of the media markets.

The share of informed voters, ρ_s , is proxied by the log of TV sets per-capita, (\log_tvpc) taken from the *Arthur S. Banks Cross National Time-Series Data Archive*. The rationale for using this variable comes from the argument that, while the share of informed voters, ρ_s , is not observed, we in fact observe the share of media users, $r_s(q_s)$, that is increasing in news coverage q_s . Because r_s , ρ_s and q_s move in the same direction, it is sufficient to look at the levels and changes in the share of media users, r_s , to test the effect of media bias (see Strömberg, 2004b). Moreover, another justification for the use of this indicator derive from the Strömberg' consideration that "the emergence of broadcast media increased the proportion of rural and low-education media consumers as it became less expensive to distribute radio waves than newspapers to remote areas, and as these groups preferred audible and visual entertainment to reading. As politicians could reach rural and low-education voters more efficiently, the model predicts an expansion in programmes that benefit these voters" (2004, p. 266).

The variable characterizing the structure of the media market is based on the Djankov et al (2003) media ownership data set. This paper examines the patterns of media ownership in 97 countries around the world, disentangled from state and private ownership of both newspaper and broadcasting media. From this data set, we use the top five shares of private television ($tvps$) under the plausible hypothesis that ownership shapes the information provided to voters and consumers. Of course, as suggested by Djankov et al (2003), ownership is not the only determinant of media content, as in many countries government regulates private media. Thus, our identification assumption is correct only if government regulations do not, in our sample, strongly bias the information coverage of private TVs.

The share of private TVs refers to 1998-99, and we assume that it remains quite stable over the observed period, as suggested by Djankov et al (2003). However, the same authors highlight that timing could be an issue, especially in transition economies where many media enterprises were privatized during the transition period or have increasing rates of foreign ownership. To reduce this potential source of bias the time coverage for these countries starts in 1996 or later, thus six years from the initial transition period. Moreover, in some specifications we checked for the status of ‘transition’ countries through a dummy variable.

Finally, for reasons explained below, and to reduce potential bias induced by differences in government control and regulation of private TV, we also use in some regressions an index of *press media freedom*. It assumes values equal to 0, 0.5 and 1 for countries that are respectively not-free, partially-free and free, based on information taken from Freedom House.

3.3 Other variables

In the empirical specification we include, apart from the mass media variables discussed above, some additional controls that are likely to affect the level of agricultural protection, as suggested by previous literature. Specifically, we start by a parsimonious specification where, as structural control, we include only the level of development, *gdppc*, measured by the real per capita GDP taken from the World Bank, *World Development Indicators*, and the share of agricultural employment, *emps*, based on *Food and Agriculture Organization* (FAO) data. The inclusion of the level of development allows us to control for the so-called ‘*development paradox*’ – namely the strong positive correlation between agricultural protection and per capita GDP – that

represents one of the most important stylized fact of agricultural protection patterns (see Swinnen, 1994; Anderson, 1995). On the other hand, the inclusion of the agricultural employment share acts as a control for the well known idea that small groups normally receive more protection and support. Moreover, we always control for any unobserved time effect by adding a set of time dummies to the specification.

Next, in a second stage we tested the robustness of our finding by adding to the specifications other controls like proxies for comparative advantage, political institutions, as well as regional fixed effects. Table 1 shows the summary statistics of the variables used in the empirical model.

4. Econometric strategy and results

The two hypotheses put forward in section (2.3) emphasize that the relationship between media variables and agricultural protection is conditional upon the level of development. Thus, one econometric strategy would be to interact our media variables with the level of development. However, a serious shortcoming of this approach is that the level of development *per se*, is an important determinant of agricultural protection, and moreover it is also strongly correlated with both the level of TV per capita, *log_tvpc*, and the share of commercial TV, *tvps*. Thus, this approach introduces too much collinearity into the model, rendering the identification problematic.³

An alternative strategy followed in this paper is to split the data set in two subsamples of ‘poor’ and ‘rich’ countries, respectively, and then to run differentiated regressions introducing our media variables linearly. To implement this strategy we

³ The pair wise correlation between our key variables are, indeed, as follows: 0.75 (*gdppc* vs. *log_tvsh*); 0.92 (*gdppc* vs. *gdppc*log_tvsg*); 0.65 (*gdppc* vs. *tvps*); and 0.89 (*gdppc* vs *gdppc*tvps*).

need to choose the cut off level of development. As theory offers no guidance to this problem, we start by assuming that the turning point of our relationship is just the sample median value of $gdppc$, equal to about 3,800 US \$. Then, we check the robustness of this assumption by increasing or decreasing this break down value.

Thus, in what follows we will run the following regressions:

$$rra_{it}^L = \alpha + \beta_1 gdppc_{it}^L + \beta_2 \log tvpc_{it}^L + \beta_3 tvpsh_{it}^L + \sum \psi X_{it}^L + \varepsilon_{it}^L, \quad (6)$$

$$rra_{it}^H = \alpha + \beta_4 gdppc_{it}^H + \beta_5 \log tvpc_{it}^H + \beta_6 tvpsh_{it}^H + \sum \zeta X_{it}^H + \varepsilon_{it}^H \quad (7)$$

where the upper cases, L and H , indicate countries with $gdppc$ levels respectively lower and higher than 3,800 US dollars; β_1 - β_6 are the coefficients to be estimated; X_{it} is a vector of additional controls; finally ε_{it} are i.i.d. error terms. Our theoretical predictions suggest that the expected signs of our key media coefficients, β_2 - β_3 and β_5 - β_6 , should be as follows: β_2 and $\beta_3 > 0$ and β_5 and $\beta_6 < 0$. Moreover, as a consequence of the ‘development paradox’, the coefficients β_1 and β_4 are expected to be positive.

4.1 Results

Table 2 shows the pooled OLS regressions over the 1992-2005 period for different specifications based on relations (6) and (7). In Column (1) we test the hypothesis that the effect of our two media variables on agricultural protection is linear, thus running the model on the full sample. The results show that neither the share of informed voters, proxy by TV sets per-capita, nor the share of private televisions, exert any significant effect on the relative rate of assistance. As expected, the level of development, $gdppc$, and the agricultural labor share, $emps$, are respectively positive and negative, but only the former is significant at the conventional level. It may be

interesting to note that when we run the regressions without media variables, the employment share is always negative and significant in all the specifications reported in the Table.

To test our non-linearity hypothesis put forward in Section 2.3 we split the sample into ‘poor’ and ‘rich’ countries. This is done in Columns (2) and (5), where the sample is divided into ‘low’ income ($gdppc < 3,800$ US\$) and ‘high’ income ($gdppc > 3,800$ US\$) countries, respectively, using as break down the median value of the sample distribution.⁴

In these regressions the two media variables are both strongly significant ($p_value < 0.05$) and, more importantly, they change in sign on passing from low (positive) to high (negative) income country sample. More specifically and in line with our hypotheses, we find that mass media-induced political bias, captured by the share of media users, and the share of private media increase agricultural protection in poor countries, but they reduce it in rich-developed ones, *ceteris paribus*.

Comparing the effect of the two samples indicates that the effect of our media variables is significantly stronger in rich vs. poor countries. Specifically, the absolute value of the estimated coefficients are from 3 (*tvps*) to 10 (*log_tvpc*) times higher in the ‘high income’ than in the ‘low income’ regression. A potential explanation for this result is that countries with a higher level of development also have better democratic institutions, that translate into a more accountable political environment. To see whether this is the case, Columns (4) and (7) control for political institutions, by

⁴ In the regressions in the table, we give the possibility for each country-year observation to enter the low or high income sample on the basis of its level of development. Thus, as it is clear by the number of countries reported at the bottom of the table, three countries enter simultaneously, in different years, in the two regressions. Note however that, even if we force each country to join only one sample, by using the country-average median as the cut-off value, the results are qualitatively and quantitatively the same.

including the *Polity2* index of democracy taken from the Polity IV data set⁵, as well as regional fixed effects to control for unobserved heterogeneity. Controlling for democracy appears important, as a potential reason for the above results is that our media variables are capturing the effect of (omitted) political institutions that are themselves important determinants of policy outcome (see Persson and Tabellini, 2003). The democracy index is significant and positive in the low income regression, but it is not significant in the high income sample. These patterns are consistent with other studies who find that better political institutions tend to reduce agricultural policy distortions (see Olper and Raimondi, 2009). Importantly for our analysis, the inclusion of the democracy index has only a minor effect on the coefficients of media variables, which are still significant and with their expected sign.

Regressions (3) and (6) add to the specification two proxies for comparative advantage which are often used in empirical studies on the political economy of agricultural policy: agricultural land per capita and agricultural net export share, measured as the ratio between export (minus import) to agricultural production. The two variables have their expected negative sign, adding significant explanatory power to the models, but they do not significantly change the effect of the media variables.

This preliminary evidence of the effect of the mass media-competition-induced political bias on agricultural protection supports our general arguments. Both the share of informed voters, here proxied by the TV sets per-capita, as well as the share of commercial TVs, positively affect *RRAs* in ‘poor’ developing countries, and have a negative effect on *RRAs* in countries with higher development levels. In the ‘low’

⁵ The Polity2 index assigns a value ranging from -10 to +10 to each country and year, with higher values associated with better democracies.

income countries sample the average level of protection is negative. Therefore these results also indicate that mass media induce an overall reduction of agriculture policy distortions.

4.2 Robustness checks

In this section we test whether potential econometric problems may affect our results. A first problem may come from our arbitrary assumption about the separation between low and high income countries: is the median development value a correct separation level or not? To check for this potential source of bias, columns (1) to (4) of Table 3 show the regression results obtained by increasing or decreasing the separation value between low and high income sample. Overall, the bias induced appears quite low. More specifically, the results change little for threshold values below and above the break down of 3,100 US\$, where the (absolute) estimated coefficient and the significant level of, especially, the TV sets per capita variable, drop somewhat. Differently, the results with a threshold of 4,500 US\$, are very close to, or slightly better than, those reported in Table 2 (columns (4) and (7)), suggesting that the 'true' threshold drop between this value and the median value of the distribution. Thus, from this evidence we conclude that the choice of the median *gdppc* as the break down level of the distribution does not introduce substantial bias into our results.

A second problem could come from the fact that, especially in the low income sample, there are several countries without democratic institutions where, potentially, the private media are under the control of the ruler. If this is the case, then it is not surprising to find that the media variables in this sample exert, compared to high income countries, a lower effect on agricultural protection. We tackled this potential

source of bias in two different ways. First, in regressions (5) and (6) of Table 3, we considered only country-year observations with a *Polity2* index that was strictly positive, or higher than 6, thus eliminating from the sample all autocracies (low income sample) or not well established democracies (high income sample). Second, in columns (7) and (8) we added to the specifications an index of media freedom based on Freedom House.

The results of these alternative regressions do not indicate that non democratic countries, or countries with less media freedom, determine the differences between the low and high income samples. More specifically, dropping autocracies from the low income sample reduces, if anything, the magnitude of the media variables. Similarly, the media freedom proxy is negative and not significant in the low income regression, and turns out to be positive and barely significant in the high income sample, but in both cases it only marginally affects the absolute magnitude of the estimated media coefficients.

A final concern is linked to our assumption that, in the observed period (1992-2005), the structure of the media markets remained stable. This is admittedly a strong assumption, forced by the fact that our indicator of the commercial TV share, *tvps*, is only available for 1998-1999. Moreover, working with a panel starting in 1992 also introduces potential simultaneity problems. To reduce this potential source of bias we ran a series of regressions working with a panel starting in 1998 and ending in 2004⁶. Thus, by construction, we left out potential endogeneity issues, rendering the

⁶ Due to the evidence discussed above (see Table 3), and as moving the sample onward increases the GDP per capita median value, the break down of the two samples of these regressions is set at 4,200 US dollars.

hypothesis of no structural change in the media market more credible.⁷ The results of these additional regressions are reported in Table 4.

This further manipulation of the data set introduced some changes in the estimated coefficients, especially for the low income sample where the significance of the share of private TVs goes down in regressions where we check for democracy (*Polity2*), a variable that turned out to be strongly significant (see columns 3 and 4). Thus, from this point of view, it is difficult in the low income sample to disentangle the effect of the media market *per se* from that of other institutional dimensions captured by the democracy index. However, the coefficient of the TV private share is still always positive in the ‘poor’ country sample and, once again, turns out to be negative and strongly significant in the high income sample.

In summary, the robustness checks reported in this section give general support to the conclusion that mass media-competition-induced political bias is important in agricultural policy and, interestingly, it goes in the direction suggested by theory. Agricultural protection appears affected by both the share of informed voters and the share of private television, but not in a linear fashion. Both these media variables tend to increase protection (or reduce taxation) in poor countries but strongly reduce it in rich ones, and, thus, reduce distortions in all countries.

5. Concluding remarks

⁷ It is important to note that in the observed period the dynamics of the media (TV) structure tend to move toward an increase in the share of commercial TVs. Thus, at least in theory, our results should be reinforced by adding this time dimension to the data, as in our low and high income country samples the trend in agricultural protection goes in opposite directions. In fact *RRAs* is increasing in the low income country sample but it is decreasing the high income sample..

This paper provides evidence on the relationship between mass media competition and agricultural protection for a large group of countries. Strömberg's (2004a) theory predicts that information provided by mass media reflects the media's incentives to provide news to different groups in society, affecting the groups' influence in policy-making. As a consequence mass media competition will induce a policy bias towards large groups because these groups are more informed voters as the mass media target them.

We apply this theory to agricultural policy. This results in the hypotheses that (a) the impact of mass media competition on agricultural policy will be conditional to the level of development, and (b) that this effect is opposite to the so called 'development paradox' of agricultural policies. Thus, the traditional switch of agricultural policy from taxation to subsidization which is associated with economic development will be smoothed in the presence of mass media competition.

We use data on agricultural policy from 60 countries, spanning a wide range of development stages and media markets, to test these predictions. In line with the theoretical hypotheses, we find that public support to agriculture is strongly affected by the structure of the mass media markets. In particular, a greater role of the private mass media in society is associated with policies which benefit the majority more: it reduces taxation of agriculture in poor countries and reduces subsidization of agriculture in rich countries, *ceteris paribus*.

This evidence is consistent with the idea that increased competition in commercial media reduces transfers to special interest groups and contributes to more efficient public policies, as a better informed electorate increases government accountability.

References

- Anderson, K. (1995). Lobbying incentives and the pattern of protection in rich and poor countries. *Economic Development and Cultural Change* 43(2), 401-23.
- Anderson, K. (2008). Five Decades of Distortions to Agricultural Incentives, in Kym Anderson (ed.) *Distortions to Agricultural Incentives*, The World Bank, Washington, D.C.. (forthcoming).
- Anderson, K., and Valenzuela E. (2008). Estimates of Distortions to Agricultural Incentives, 1955 to 2007. World Bank, Washington DC, forthcoming October. www.worldbank.org/agdistortions.
- Anderson, S.P. and S. Coate, (2005). Market Provision of Broadcasting: A Welfare Analysis, *Review of Economic Studies* 72(4): 947-972.
- Becker, G. S. (1983). A Theory of Competition Among Pressure Groups for Political Influence, *Quarterly Journal of Economics*, 98: 371-400.
- Besley, T. and R. Burgess, (2001). Political Agency, Government Responsiveness and the Role of the Media, *European Economic Review* 45: 629-640.
- Besley, T. and R. Burgess, (2002). The Political Economy of Government Responsiveness: Theory and Evidence from India, *The Quarterly Journal of Economics* 117(4): 1415-1451.
- De Gorter, H. and Swinnen, J. (2002). Political economy of agricultural policy, in Gardner, B. and Rausser, G. (eds), *Handbook of Agricultural Economics*, Vol. 2B, 1893-1943.
- Downs, A. (1957). *An Economic Theory of Democracy*, New York, Harper and Row.
- Djankov, S., McLiesh, C., Nenova, T. and A. Shleifer, (2003). Who Owns The Media? *Journal of Law and Economics* 46: 341-381.
- Francken, N., Minten, B. and J. Swinnen, (2009). Media, Monitoring, and Capture of Public Funds: Evidence from Madagascar, *World Development*, Vol. 37, No. 1: 242-255.
- Kuzyk, P. and J.J. McCluskey (2006). The Political Economy of the Media: Coverage of the U.S.-Canadian Lumber Trade Dispute, *World Economy* 29(5): 637-654.
- Lindbeck, A. and Weibull, J.W. (1987). Balanced-Budget Redistribution as the Outcome of Political Competition, *Public Choice* 52: 273-297.

- McCluskey, J. and Swinnen, J. (2008). Media Economics and the Political Economy of Information. Chapter prepared for *The Oxford Handbook of Business and Government*, August 15.
- Oberholzer-Gee, R. and J. Waldfogel (2005) Strength in Numbers: Group Size and Political Mobilization, *Journal of Law and Economics*, vol. XLVIII: 73-91.
- Olper, A. and Raimondi, V. (2009). Constitutional Rules and Agricultural Policy Outcomes, in Kym Anderson (ed.) *Political Economy of Distortions to Agricultural Incentives*, The World Bank, Washington, D.C.. (forthcoming).
- Olson, M. Jr. (1965). *The Logic of Collective Action. Public Goods and the Theory of Groups*. Cambridge: Harvard University Press.
- Persson, T. and Tabellini, G. (2003). *The Economic Effect of Constitutions*. Cambridge, The MIT Press.
- Prat, A. and D. Stromberg. (2005). Commercial Television and Voter Information, CEPR Discussion Papers: 4989.
- Reinikka, R. and Svensson, J. (2005). Fighting Corruption to Improve Schooling: Evidence from a Newspaper Campaign in Uganda, *European Economic Review* 3(2-3): 259-267.
- Strömberg, D. (2001). Mass Media and Public Policy. *European Economic Review* 45: 652-663.
- Strömberg, D., (2004a). Mass Media Competition, Political Competition, and Public Policy. *Review of Economic Studies* 71: 265-284.
- Strömberg, D., (2004b). Radio's Impact on Public Spending. *Quarterly Journal of Economics* 119: 189-221.
- Strömberg, D. and Snyder, J.M. (2008). The Media's Influence on Public Policy Decisions, in Islam, R. (ed.) *Information and Public Choice. From Media Markets to Policy Making*, The World Bank, Washington, D.C.: 17-31.
- Swinnen, J. (1994). A Positive Theory of Agricultural Protection, *American Journal of Agricultural Economics*, 76(1): 1-14.
- Swinnen, J. (2009). The Political Economy of Agricultural Distortions: The Literature to Date, in Kym Anderson (ed.), *Political Economy of Distortions to Agricultural Incentives*, Washington, DC: The World Bank. (forthcoming).

Table 1.
Descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	N. obs.	N. countries
<i>Relative rate of assistance</i>	19.20	7.61	267.94	-87.87	52.85	753	59
<i>Log TV per capita</i>	5.38	5.83	7.38	1.10	1.23	753	59
<i>Tv private share</i>	0.45	0.43	1.00	0.00	0.31	753	59
<i>GDP per capita</i>	9797	3790	39969	79	11124	753	59
<i>Agricultural employment share</i>	0.27	0.14	0.85	0.01	0.26	753	59
<i>Land per capita</i>	1.28	0.56	26.83	0.04	3.31	753	59
<i>Net export share</i>	-0.01	0.01	1.20	-1.22	0.41	753	59
<i>Democracy index (Polity2)</i>	5.98	8.00	10.00	-7.00	5.42	753	59
<i>Press freedom</i>	0.68	1.00	1.00	0.00	0.38	753	59

Notes: See text for variables description.

Table 2.
Effect of the media on agricultural protection: econometric results

Variables	Dependent variable						
	<i>- Agricultural Relative Rate of Assistance -</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Log TV per capita</i>	4.79 <i>1.42</i>	5.77*** <i>2.60</i>	4.08* <i>1.78</i>	5.34* <i>1.66</i>	-56.94** <i>-2.52</i>	-47.82** <i>-2.31</i>	-46.93* <i>-1.84</i>
<i>TV private share</i>	-12.07 <i>-1.09</i>	19.94*** <i>3.14</i>	19.06*** <i>3.10</i>	17.76** <i>2.52</i>	-76.03*** <i>-3.33</i>	-70.01*** <i>-3.18</i>	-89.23*** <i>-3.08</i>
<i>GDP per capita</i>	0.03*** <i>4.54</i>	0.02 <i>0.88</i>	0.04 <i>1.43</i>	0.03 <i>1.14</i>	0.05*** <i>4.86</i>	0.04*** <i>5.15</i>	0.04*** <i>3.59</i>
<i>Agricultural employment share</i>	-25.32 <i>-1.36</i>	-14.98 <i>-1.18</i>	-18.73 <i>-1.51</i>	-14.44 <i>-0.99</i>	136.39 <i>1.12</i>	166.85 <i>1.52</i>	-19.37 <i>-0.15</i>
<i>Land per capita</i>			-6.35*** <i>-3.19</i>	-7.34*** <i>-2.97</i>		-0.65 <i>-1.36</i>	1.02 <i>1.05</i>
<i>Net export share</i>			-10.58** <i>-2.31</i>	-9.46** <i>-1.94</i>		-27.99*** <i>-4.50</i>	-16.04*** <i>-2.55</i>
<i>Democracy index (Polity 2)</i>				0.70* <i>1.66</i>			-0.31 <i>-0.10</i>
Continental dummies	No	No	No	Yes	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full Sample	Low Income	Low Income	Low Income	High Income	High Income	High Income
Nr. Obs.	753	379	379	379	381	376	376
Nr. Countries	59	33	33	33	33	33	33
Adj R square	0.47	0.42	0.46	0.47	0.46	0.53	0.66

Notes: *t*-values robust to heteroschedasticity and autocorrelation in italics under the coefficients. The break down for Low and High income samples correspond to a *gdppc* level of 3,800 US dollars. (See text).

*** $p < .01$; ** $p < .05$; * $p < .10$.

Table 3.
Robustness checks: econometric results across different samples

Variables	Dependent variable		- Agricultural Relative Rate of Assistance -					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Log TV per capita</i>	3.30 <i>0.96</i>	6.48** <i>2.09</i>	-35.91 <i>-1.58</i>	-46.56* <i>-1.74</i>	3.44 <i>0.72</i>	-56.93** <i>-2.24</i>	5.46* <i>1.66</i>	-53.01** <i>-2.03</i>
<i>TV private share</i>	19.79*** <i>2.65</i>	16.72** <i>2.44</i>	-80.77*** <i>-2.80</i>	-97.58*** <i>-3.31</i>	15.15** <i>2.11</i>	-60.45* <i>-1.94</i>	18.03*** <i>2.60</i>	-77.48*** <i>-2.61</i>
<i>GDP per capita</i>	0.06** <i>2.13</i>	0.01 <i>0.65</i>	0.04*** <i>3.38</i>	0.05*** <i>3.71</i>	0.03 <i>1.45</i>	0.05*** <i>4.11</i>	0.03 <i>1.01</i>	0.05*** <i>3.66</i>
<i>Agricultural employment share</i>	-17.05 <i>-1.11</i>	-11.93 <i>-0.83</i>	17.06 <i>0.17</i>	28.22 <i>0.19</i>	-19.43 <i>-1.52</i>	51.03 <i>0.39</i>	-16.31 <i>-1.11</i>	-22.93 <i>-0.18</i>
<i>Land per capita</i>	-6.71** <i>-2.54</i>	-7.43*** <i>-3.08</i>	0.87 <i>0.91</i>	1.28 <i>1.30</i>	-5.94** <i>-2.51</i>	0.26 <i>0.26</i>	-7.15*** <i>-2.90</i>	0.79 <i>0.81</i>
<i>Net export share</i>	-11.53** <i>-2.16</i>	-8.30* <i>-1.81</i>	-15.83** <i>-2.55</i>	-17.26*** <i>-2.70</i>	-9.50 <i>-1.45</i>	-16.14*** <i>-2.73</i>	-10.62** <i>-2.16</i>	-14.80** <i>-2.45</i>
<i>Democracy index (Polity 2)</i>	0.50 <i>1.09</i>	0.79 <i>1.96</i>	0.48 <i>0.17</i>	-1.32 <i>-0.30</i>	2.34*** <i>3.27</i>	-7.40 <i>-0.86</i>	0.78* <i>1.80</i>	-1.90 <i>-0.53</i>
<i>Press freedom</i>							-2.84 <i>-0.65</i>	33.85* <i>1.71</i>
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	<i>gdppc < 3100</i>	<i>gdppc < 4500</i>	<i>gdppc > 3100</i>	<i>gdppc > 4500</i>	<i>gdppc < 3800; Polity > 0</i>	<i>gdppc > 3800; Polity > 6</i>	<i>gdppc < 3800</i>	<i>gdppc > 3800</i>
Nr. Obs.	339	403	409	352	247	351	377	376
Adj R square	0.46	0.48	0.65	0.66	0.55	0.68	0.48	0.67

Notes: *t*-values robust to heteroschedasticity and autocorrelation in italics under the coefficients.

****p* < .01; ***p* < .05; **p* < .10.

Table 4.
Robustness checks: pooled regressions in the 1998-2004 time period

Variables	Dependent variable							
	<i>- Relative Rate of Assistance in Agriculture -</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Log TV per capita</i>	8.64*** <i>3.31</i>	7.07*** <i>3.00</i>	7.26** <i>2.47</i>	6.63* <i>1.83</i>	-43.32* <i>-1.71</i>	-37.55* <i>-1.62</i>	-31.49 <i>-1.32</i>	-29.63 <i>-1.23</i>
<i>TV private share</i>	18.83** <i>2.45</i>	16.97** <i>2.35</i>	8.55 <i>1.24</i>	5.89 <i>0.80</i>	-71.50*** <i>-2.77</i>	-62.37*** <i>-2.59</i>	-68.11** <i>-2.53</i>	-78.76** <i>-2.54</i>
<i>GDP per capita</i>	0.02 <i>0.83</i>	0.03 <i>1.18</i>	0.03 <i>1.02</i>	0.03 <i>1.00</i>	0.04*** <i>3.65</i>	0.04*** <i>4.14</i>	0.04*** <i>4.11</i>	0.04*** <i>3.10</i>
<i>Agricultural employment share</i>	-4.67 <i>-0.36</i>	-10.25 <i>-0.79</i>	0.45 <i>0.03</i>	4.89 <i>0.31</i>	91.55 <i>0.62</i>	141.88 <i>1.10</i>	107.77 <i>0.85</i>	-42.13 <i>-0.31</i>
<i>Land per capita</i>		-8.78*** <i>-2.85</i>	-10.40*** <i>-3.93</i>	-11.05*** <i>-3.24</i>		-0.99 <i>-1.79</i>	-0.87 <i>-1.43</i>	0.46 <i>0.39</i>
<i>Net export share</i>		-7.48 <i>-1.54</i>	-5.86 <i>-1.06</i>	-5.28 <i>-0.95</i>		-26.50*** <i>-3.99</i>	-25.52*** <i>-4.01</i>	-12.13* <i>-1.75</i>
<i>Democracy index (Polity 2)</i>			1.50*** <i>2.83</i>	1.47*** <i>2.66</i>			-7.54 <i>-1.14</i>	-3.44 <i>-0.95</i>
Continental dummies	No	No	No	Yes	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Low Income	Low Income	Low Income	Low Income	High Income	High Income	High Income	High Income
Nr. Obs.	212	212	212	212	223	223	223	223
Adj R square	0.42	0.49	0.55	0.55	0.40	0.49	0.5	0.66

Notes: *t*-values robust to heteroschedasticity and autocorrelation in italics under the coefficients. The break down for Low and High income samples correspond to a *gdppc* level of 4,200 US dollars. (See text).

****p* < .01; ***p* < .05; **p* < .10.